



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:)
Phillips et al.)
Serial No. 10/706,142)
Filing Date: November 12, 2003)
Confirmation No. 6069)
For: Methods for Forming Security)
Articles Having Diffractive)
Surfaces and Color Shifting)
Backgrounds)
_____)

Atty Docket No.:
78384 18-32 US DIV1
Art Unit: 1732
Examiner:
Mathieu D. Vargot

DECLARATION UNDER 37 CFR 1.132

Mail Stop Amendments
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
U.S.A.

Sir:

City of Santa Rosa
State of California,

I, Roger W. Phillips declare that all statements made of my own knowledge are true, and that all statements made on information and belief are believed to be true:

I Roger W. Phillips reside at 466 Jacqueline Drive, Santa Rosa, California, 95405.

I Roger Phillips am an inventor on United States Patent application 10/706,142 filed November 12, 2003 and declare that the Exhibits that accompany this declaration were made at my request and in accordance with my instructions.

I am an expert in the field of thin film coatings.

I Roger Phillips have a Ph.D in physical chemistry from the University of California at Davis (1968. Subsequently, I worked for the Du Pont de Nemours Company (Experimental Station in Wilmington DE) for five years followed by work at The Aerospace Corporation (El Segundo CA) and have been working in thin film optics at OCLI/Flex Products (now JDSU) for the last 28 years. I am also the inventor of optically variable ink that is now used on over 100 countries world wide. I am well known in the document security field and have been and currently am an organizer for the Conference on Document Security held in San Jose, California every other year.

Each of Exhibits A through E has two different side-by-side samples. The sample on the right side of each Exhibit is coated on a same side of the substrate as the diffractive surface (hologram) and the sample on the left of each Exhibit is coated on opposite sides of the substrate(hologram and coating is on opposite sides of substrate) in accordance with the invention claimed in application 10/706,142.

The two side-by-side samples 2a and 2b in Exhibit A were coated with the same coating materials and same thicknesses.

The two side-by-side samples 3a and 3b in Exhibit B were coated with the same coating materials and same thicknesses.

The two side-by-side samples 4a and 4b in Exhibit C were coated with the same coating materials and same thicknesses.

The two side-by-side samples 5a and 5b in Exhibit D were coated with the same coating materials and same thicknesses.

The two side-by-side samples 6a and 6b in Exhibit E were coated with the same coating materials and same thicknesses.

Exhibit A consists of Samples 2a and 2b coated with same 5 layer all dielectric coatings on a flat and on an embossed side of substrate respectively. Run 1315-1662 and Run 1315-1660 respectively. Ukrainian Hologram (Big Circle)

Exhibit B consists of Samples 3a and 3b coated with a same Absorber/Dielectric/Reflector coating on a flat and on an embossed side of substrate respectively. Run 1315-1666 and Run 1315-1665 respectively. Wine Glass Holograms.

Exhibit C consists of Samples 4a and 4b coated with a same Absorber/Dielectric/Reflector coating on flat and on embossed side of substrate. Run 1315-1666 and Run 1315-1665 respectively. Ukrainian Hologram (Big Circle)

Exhibit D (Sample 5) is a 7 layer all dielectric coating on the flat and on embossed side of substrate. Run 1315-1663 and Run 1315-1661 respectively. Ukrainian Hologram (Big Circle)

Exhibit E (Sample 6) is a 7 layer all dielectric coating on flat and on an embossed side of substrate. Run: 1315-1663 and Run 1315-1661 respectively. Wine Glass Holograms.

Similar substrates were used for all of the exhibits and has an embossed side and a flat side; and, the same substrate was used for each a and b sample for each Lenta Card.

The coatings on the left of each Exhibit, samples 2a, 3a, 4a, 5a and 6a covering the black and white regions of the LENTA card are coated on a flat side of the substrate and the coatings on the right side of each LENTA card, coatings 2b, 3b, 4b, 5b and 6b are coated on the embossing on the embossed side of the substrate.

For comparison LENTA cards 3 and 4 (Exhibits Band C) are a metal-dielectric Fabry Perot design in accordance with the coatings taught in this invention, using the same center wavelength (550nm) that they have a significantly different visual appearance.

Exhibit A, (Sample 2) is 5 layer all dielectric patterned after Uyama on flat and on embossed side of substrate. Run 1315-1662 and Run 1315-1660 respectively. Ukrainian Hologram (Big Circle)

Exhibit B, (Sample 3) is an Absorber/Dielectric/Reflector on flat and on embossed side of substrate. Run: 1315-1666 and Run 1315-1665 respectively. Wine Glass Holograms

Exhibit C, (Sample 4) is an Absorber/Dielectric/Reflector on flat and on embossed side of substrate. Run 1315-1666 and Run 1315-1665 respectively. Ukrainian Hologram (Big Circle)

Exhibit D, (Sample 5) is a 7 layer all dielectric patterned after Uyama on flat and on embossed side of substrate. Run 1315-1663 and Run 1315-1661 respectively. Ukrainian Hologram (Big Circle)

Exhibit E, (Sample 6) is a 7 layer all dielectric patterned after Uyama on flat and on embossed side of substrate. Run: 1315-1663 and Run 1315- 1661 respectively. Wine Glass Holograms

After visually inspecting the all dielectric coatings in Samples 2, 5 and 6 I have observed that when the thin film coating is on the embossed side and viewed against a black background, it is brighter than if the hologram and the thin film are on opposite sides. I also noted when visually inspecting the samples where the thin film is on the flat side of the substrate, that the hologram is more subtle to see. This difference can be ascribed to the reflection off of the hologram, i.e. when on opposite sides, the reflection is based on the reflection characteristics of the substrate whereas when it is on the same side, the holographic reflection is based on the overall reflection of the thin film filter. The blue color at angle for the hologram can also been seen more readily for the sample when the hologram is on the same side (on the embossing) as the thin film filter than in the case where the hologram is on the opposite side of the substrate to the thin film coating.

For Sample 3 we have the case where the orientation of the hologram is not the same in the two orientations even though the original embossing was the same.

A major difference in coating the embossed versus the flat side can be seen in the wine glass hologram. Each hologram consists of two large wine glasses, one side up and one upside down. In the case where the coating is on the flat side (side opposite the embossing) a smaller tipping wine glass inside the larger wine glass can be seen as one tilts the sample - in the left upright large wine glass (large exemplar on left) or in the right upside down large wine glass (in the small attached exemplar at bottom). The difference in these two exemplars is in the orientation of the exemplars, each being rotated 180 degrees with respect to one another.

In the case where the coating is on the embossed side, the tipping wine glass can now be found in a different location - the tipping

small wine glass is now on the left in the upside down wine glass (large exemplar), or is in the large upright glass on the right side (small exemplar). Again, the small and large exemplars are rotated 180 degrees with respect to one another.

It is not possible to get the tipping wine glass in the same location for both coatings - one on the flat side of the substrate and one on the embossed side of the substrate. In other words, it does make a difference which side one coats - one gets different oriented holograms or images depending on the type of holographic image.

A second difference between whether the thin film coating is on the embossed side or the flat side of the substrate (i.e. on the same side as the hologram or on opposite sides of the substrate) can also be seen. What you will observe is that for the thin film on the flat side (opposite sides) at certain angles one can not see the hologram but only the thin film filter. In contrast, one sees the hologram at all angles with changing colors as the sample is tilted for the case where the thin film and the hologram are on the same side of the substrate. This is true, particularly, when viewed on a black background. The same effect also seen in sample 4.

For sample 4 we also have observation that the thin film on the hologram provides a brighter image than for the case where the thin film coating and the hologram are on the opposite sides of the substrate.

For sample 5, the 7 layer all dielectric coating has same effects as for Sample 6 (hologram on flat side fades in and out as one tilts the sample) and the hologram appears brighter when the thin film coating is deposited directly on it than when the thin film is on the side opposite of the substrate to the hologram.

For sample 6 we also see that for the 7 layer all dielectric coating the wine glass hologram fades in and out as one tilts the sample for the coating and hologram on opposite sides of the substrate. At the fade out angles, one only sees the color shift thin film. In contrast, one sees the wine glass hologram at all angles of tilt for the case where the thin film coating is on the hologram (embossing) side.

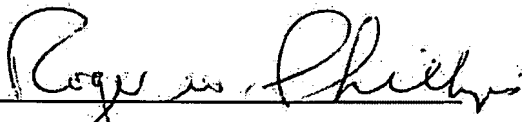
Some other observations I have noted: The all dielectric designs suffer from stress as evidenced by the peeling of the coatings from the substrate. The Fabry Perot coating is much more robust and does not have the peeling and loss of adhesion as does the all

dielectric coating. The hologram on the all dielectric coating has a reduced brightness compared to the Fabry Perot coating.

Exhibit F is an attached graph and Coating Request Sheet specifying details of the various designs of Exhibits A through E.

To summarize my observations, there is a subtle but significant difference in the appearance of the samples having the hologram and color shifting coating on opposite sides of the substrate from the samples having the hologram and color shifting coating on the same side of the substrate. It is these subtle differences that provide a required difference in the field of security coatings. This difference can be used to distinguish a counterfeit from an authentic security device.

The undersigned declares that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.


Signed at Santa Rosa, CA, USA this 26th day of April, 2007.